

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification⁶:

A45B 17/00

A1

(11) International Publication Number:

WO 99/56579

(43) International Publication Date: 11 November 1999 (11.11.99)

(21) International Application Number: PCT/GB99/01382

(22) International Filing Date: 4 May 1999 (04.05.99)

(30) Priority Data:

9809644.9

6 May 1998 (06.05.98)

GB

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(GB).(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR,
BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD,
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP,
KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK,
MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI,
SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA,
ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ,
UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD,
RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK,
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI
patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR,
NE, SN, TD, TG).

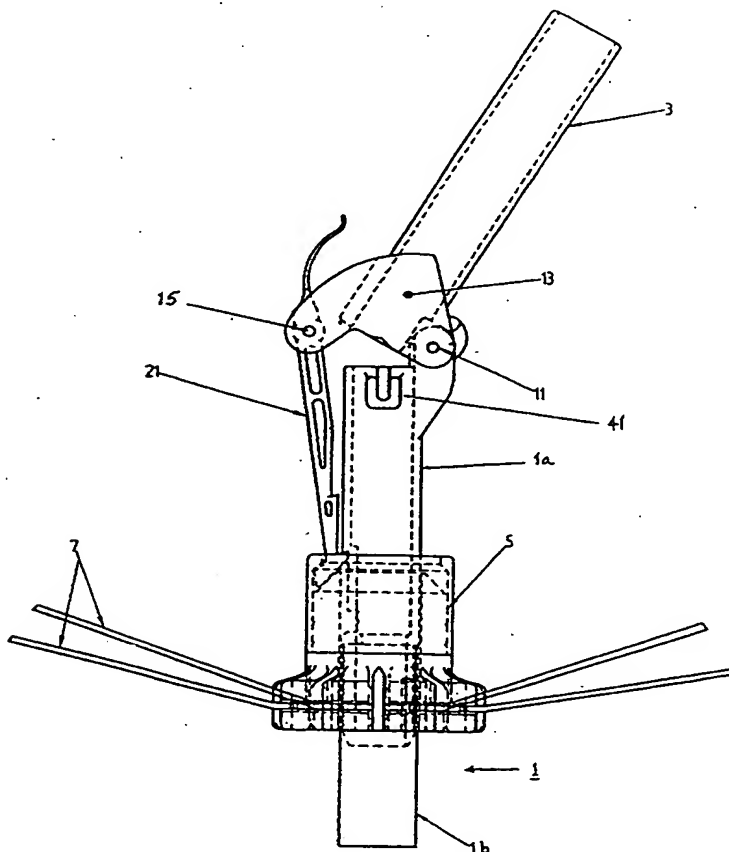
Published

With international search report.

(54) Title: TILTING UMBRELLA

(57) Abstract

A tilting umbrella frame includes an upper shaft part (3) and a lower shaft part (1), the two parts being connected by a tilting joint to enable the upper part to tilt about an axis (11) with respect to the lower. A runner (5) slides on the lower shaft part, for spreading the cover of the umbrella into its unfurled configuration, and, once the umbrella is unfurled, for tilting the upper part. To this end a lever (21) connected to and arranged outside the upper shaft part is arranged to transmit a pushing force from the runner (5) to the upper shaft part under (3) as the runner is pushed beyond a certain point at or near the point corresponding to the completely unfurled configuration. The lower end of the lever (21) is held captive in the runner during tilting to enable the runner to pull the shaft back to the straight configuration.



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-1-

TILTING UMBRELLA

The invention concerns a frame for a tilting umbrella and is particularly useful for a large
5 umbrella or parasol of the type that is used to provide shade at tables and so on. The tilting facility allows the cover of the umbrella to be angled as required by the position of the sun.

Large static umbrellas are often tilted by means
10 of a handle mechanism such as a crank or draw cord, because the top of the umbrella is too high to reach or is too heavy. The handle is provided at a level easy for the user to reach and is connected by some mechanism such as a chain, cord or rack to the runner
15 of the umbrella, i.e. the moving part to which the stretchers are attached. The crank thus serves both to lift and lower the runner to raise the umbrella into its unfurled position, and to lower it again when required.

20 The tilting action takes place as the runner reaches its top position, i.e. when the umbrella is completely unfurled. At this point further movement of the runner engages a further member associated with the shaft near the tilting joint, causing the tilt to be
25 carried out. One such mechanism is shown, for instance, in US-A-3182673 (S. N. Small), which shows a crank mechanism raising a runner which in turn slides a pin in an angled slot in the upper shaft member. The angle gives rise to a cam action bringing about a tilt
30 of the upper shaft member.

The Small construction is rather unusual in that the tilting hinge is located above the runner, even when the runner is slid to its operating position. In most tilting umbrellas, such as for instance in US
35 3850186 (Weber et al.), US 4697606 (Ma) or US 5029596 (Tung) the runner first slides on to the upper shaft

-2-

part, and then tilts with it. This latter construction has problems of stability and is of little significance to the present invention.

5 While devices of the type shown in the Small patents have been known for a long time they involve the disadvantage that cutouts must be made in the shaft to accommodate various parts of the mechanism, in particular the sliding pin. This weakens the assembly; moreover the insertion of a considerable number of
10 connecting parts into the shaft is tricky from the manufacturing point of view. It is an aim of the invention to mitigate these disadvantages.

According to the invention there is provided an umbrella frame including an upper shaft part and a
15 lower shaft part, the two parts being connected by a tilting joint to enable the upper part to tilt with respect to the lower, a runner sliding on the lower shaft part, for spreading the cover of the umbrella into its unfurled configuration, and a lever connected
20 to and arranged outside the upper shaft part, arranged to tilt the upper shaft part under the influence of the runner as the runner is pushed beyond a certain point at or near the point corresponding to the completely unfurled configuration.

25 Because the lever is outside the shaft the integrity of the shaft construction can be maintained while preserving the advantage of stability afforded by having the runner slide only on the lower shaft part, i.e. with the tilt joint above the runner. Also the
30 lever construction allows a particularly simple assembly with only two moving parts other than the runner, namely the lever and the upper shaft part.

Preferably the tilt axis is located radially outwards of the axis of the shaft, and the attachment
35 of the lever to the upper shaft is about a horizontal hinge generally on a level with and parallel to the

-3-

tilt axis, on the opposite side with respect to the axis of the umbrella shaft so as to afford the necessary leverage. It is best if during its action the lever is held captive by the runner, so that the runner can pull the lever down as well as push it up. This can be achieved by giving the lever a lug near its lower end, facing outwards and engaged by an inwardly facing lip of the runner. In order to allow release of the lug from the lip, so that the runner is free to travel down the shaft to fold the umbrella, the shaft can have a recess at some point on the travel of the runner, preferably at the point at which the runner first engages, so as to allow the end of the lever to be pressed further radially inwards as the runner travels downwards and thus to release the connection of the lever to the runner.

A restoring means such as a spring urging the lower end of the lever against the shaft can be provided, so as to ensure that the runner travels over the lug of the lever as it travels upwards, allowing engagement, and the runner and lug can have suitable inclined surfaces such that the upward movement of the runner lifts the lower end of the lever out of the recess, freeing the lever to be pushed upwards.

The invention is particularly applicable to tilting umbrellas of the kind in which unfurling and tilting the umbrella is performed by means of a crank, draw cord or other means lower down on the lower shaft part, i.e. accessible to a user, and in the case of a crank some device such as a cable or rack mechanism for transforming the turning action into a lift of the runner and, subsequently, a tilt.

For a better understanding of the invention an embodiment of it will now be described, by way of example, with reference to the accompanying drawings, in which:

-4-

Fig. 1 shows a perspective view of the runner and tilt assembly in the position where the head has just started to tilt;

5 Fig. 2 shows the two shaft parts with the lever, in the tilted configuration but with the runner omitted;

Fig. 3 shows a side view, partly in section, of the assembly with the runner engaged on the lever but before tilting; and

10 Figs. 4A and 4B show the main parts of the runner assembly.

In Fig. 1 an umbrella shaft is in two parts, a lower part 1 and an upper part 3 pivoting on the lower about an axis 11. At the top of the upper part 3, 15 though not shown, there is the usual head with ribs extending radially and supporting a cover. On the lower shaft part there is a slider or runner 5 from which extend, likewise radially and corresponding in number to the ribs, stretchers 7 meeting the ribs 20 somewhere along their length so as to hold them extended with the cover taut when the umbrella is in use. To fold the umbrella the runner is slid down the lower shaft part 1 in the usual way.

It is possible to design a tilting umbrella so 25 that the tilt action is independent of the movement of the runner, although clearly the runner does have to be near its uppermost position for a tilt movement to be possible or of any use, since otherwise the umbrella cover is folded. However, particularly with large 30 sunshades it represents a simplification for the user for the tilt to happen automatically on further movement of the runner after it has more or less reached its top position, and the invention is concerned with this kind of mechanism.

35 In the embodiment shown the connection of the runner movement to the tilt action is effected by a

-5-

lever 21 extending from an attachment point near the base of the upper shaft part 3, generally parallel to the shaft, downwards along the lower shaft part to the runner, and by a corresponding construction of the runner 5 itself, to be explained below. The lever 21 is pivoted near its upper end on a pin 15 located parallel to, and at approximately the same height as, the pivot 11 in a suitably shaped base portion 13 of the upper shaft 3; this base portion is constituted by two roughly triangular plates moulded on to opposite sides of the lower end of the upper shaft tube. The axes 11 and 15 lie on opposite sides of the central shaft axis. The other end of the lever has a foot-like shape, shown from the side in Fig. 3, with an inner catch or heel 23, an inclined lower surface 24 and an outwardly protruding toe 25, the functions of which various parts will become apparent subsequently. The upper end of the lever also has a spring leaf 29 which in the straight configuration of the shaft presses against the upper part, and hence urges the foot end of the lever against the lower shaft part.

Where it faces the lever 21 the lower shaft part 1 has a recess 31 into which the heel 23 of the lever fits, under the urging of the leaf 29, when the shaft is straight. There is also a further recess 33 which matches a further shoulder 27 on the lever. Both shaft parts and the lever can be made for instance of a plastics material or of steel or any suitable alloy, the latter particularly in the case of the shaft. In fact the lower shaft part 1 is itself made in two sections, the upper or hinge section 1a and the lower section 1b, providing the main length of the shaft. The hinge section 1a of the lower shaft part 1 is sufficiently long to accommodate the mechanism; say about 20 cm long, and has an end portion 17 with ridges for insertion into the lower section or pole 16. At

-6-

its top end, in the vicinity of and to one side of the hinge, the shaft section 1a has a boss 41 extending outwards, in which is a groove constituting a guide for the cord used to raise the runner.

5 The runner 5 is constructed in two main parts, namely an outer ring or sleeve 51 and a core 55, as shown in Figs. 4A and 4B, the ring fitting over and engaging with the core as shown in Fig. 3. A one-piece construction would also be possible though the two-
10 piece version may be easier to manufacture. The two parts are held together by engagement of two internal annular ridges (not shown) in the sleeve 51 with corresponding grooves in the exterior of the
15 cylindrical section of the core 55; alternatively or additionally they can be glued together. The upper rim of the ring 51 has an inwardly facing bead 53 for co-operating with the toe 25 of the lever, and the lower part of the core has the flange 59 into which the inner ends of the stretchers are fastened, and may also have
20 a downwardly extending sleeve part (not shown) to act as a grip for manual operation of the umbrella. The upper end of the core 55 is bevelled so as to form a sloping surface 57 co-operating with the sloping lower surface or sole of the foot of the lever, as will be
25 explained.

In terms of materials, typically the hinge section of the lower shaft part can be made of a plastics material such as acetal or nylon, the pole of
aluminium, steel or wood, and the upper shaft section
30 of nylon. The lever can be made of acetal, while one or both parts of the runner can be made of a cheaper plastics material such as HDPE.

Operation of the umbrella from the folded state is as follows. The runner is first raised, by hand or by
35 a mechanism such as a crank-operated cord passing up through the shaft (or in the case of a wooden shaft

-7-

outside the shaft), returning round the guide 41 (or pulley) and down to the runner, until the runner is raised sufficiently far for the ribs and stretchers to be extended and the cover taut. At this point the runner is approximately in the position shown in Fig. 3. If the umbrella is to stay straight this is the end of the operation.

If the user wants to tilt the umbrella he simply lifts the runner a little further, until the bevelled surface 57 of the core of the runner 5 starts to ride under the sole 24 of the foot of the lever 21. The lever is thus pivoted radially outwards, clearing the recess 31. The clearance between the toe 25 of the lever and the inner rim 53 of the ring 51 is chosen to accommodate this amount of radial travel but little more, so that the foot of the lever is then trapped under the rim 53. The runner then pushes the lever upwards by pressure of the bevelled surface 57 against the sole 24, the heel sliding axially upwards over the lower shaft 1.

As the lever travels upwards it exerts a torque, via its attachment point 15 on the base portion 13, around the hinge 11 on the upper shaft part 3, and the upper shaft part tilts. This tilting continues as long as required, if the cable mechanism is capable of holding the head of the umbrella in position, or until the heel 23 reaches the second shoulder 33 on the shaft. This is the end position since the foot is not able to swing out any further to clear this shoulder.

For the reverse operation the handle is cranked the other way and the runner 5 is moved downwards, drawing the lever with it via the head 53 and the toe 25, until the lower limit of travel of the lever is reached and the heel 23 again engages into the recess 31 under the action of the leaf spring 29. At this point the rim 53 no longer engages with the foot of the

-8-

lever and the runner can travel further downwards if required.

5 It is advantageous that the runner can also be used to pull the lever downwards, because this allows a positive "untilting" operation as well as the tilting. However, the straightening of the umbrella shaft could also be effected by way of a suitable return spring, if it were sufficiently strong. The disadvantage of such an arrangement would be that the tilting action would
10 have to take place against the force of this spring.

Another alternative would be a separate manually operated return mechanism such as a second cord. This could be incorporated into the crank mechanism, so as to form a cord system to pull the runner down the shaft
15 as well as up it; the mechanism could also serve the purpose of holding the top shaft 3 at any desired angle of tilt.

CLAIMS

1. An umbrella frame including an upper shaft part and a lower shaft part, the two parts being
5 connected by a tilting joint to enable the upper part to tilt with respect to the lower, a runner sliding on the lower shaft part, for spreading the cover of the umbrella into its unfurled configuration, and a lever connected to and arranged outside the upper shaft part,
10 acting to tilt the upper shaft part under the influence of the runner as the runner is pushed beyond a certain point at or near the point corresponding to the completely unfurled configuration.

15 2. An umbrella frame according to claim 1, in which the tilt axis of the upper shaft part is located radially outwards of the axis of the shaft, and the attachment of the lever to the upper shaft is about a hinge generally on a level with and parallel to the
20 tilt axis, on the opposite side with respect to the axis of the umbrella shaft.

3. An umbrella frame according to claim 1 or 2, in which the lever has a means for holding it captive
25 on the runner.

4. An umbrella frame according to claim 3, in which the means comprises an outwardly facing lug near the lower end of the lever, and an inwardly facing lip
30 of the runner, engaging the lug during a tilting operation.

5. An umbrella frame according to claim 4, in which the shaft has a recess at some point on the
35 travel of the runner preferably at the point at which the runner first engages the lug, so as to allow the

-10-

end of the lever to be pressed further inwards as the runner travels downwards and thus to release the connection of the lever to the runner.

5 6. An umbrella frame according to claim 5, and further including a restoring means urging the lower end of the lever against the shaft so as to ensure that the lip of the runner travels over the lug of the lever as it travels upwards up to and past the point of its
10 first engagement.

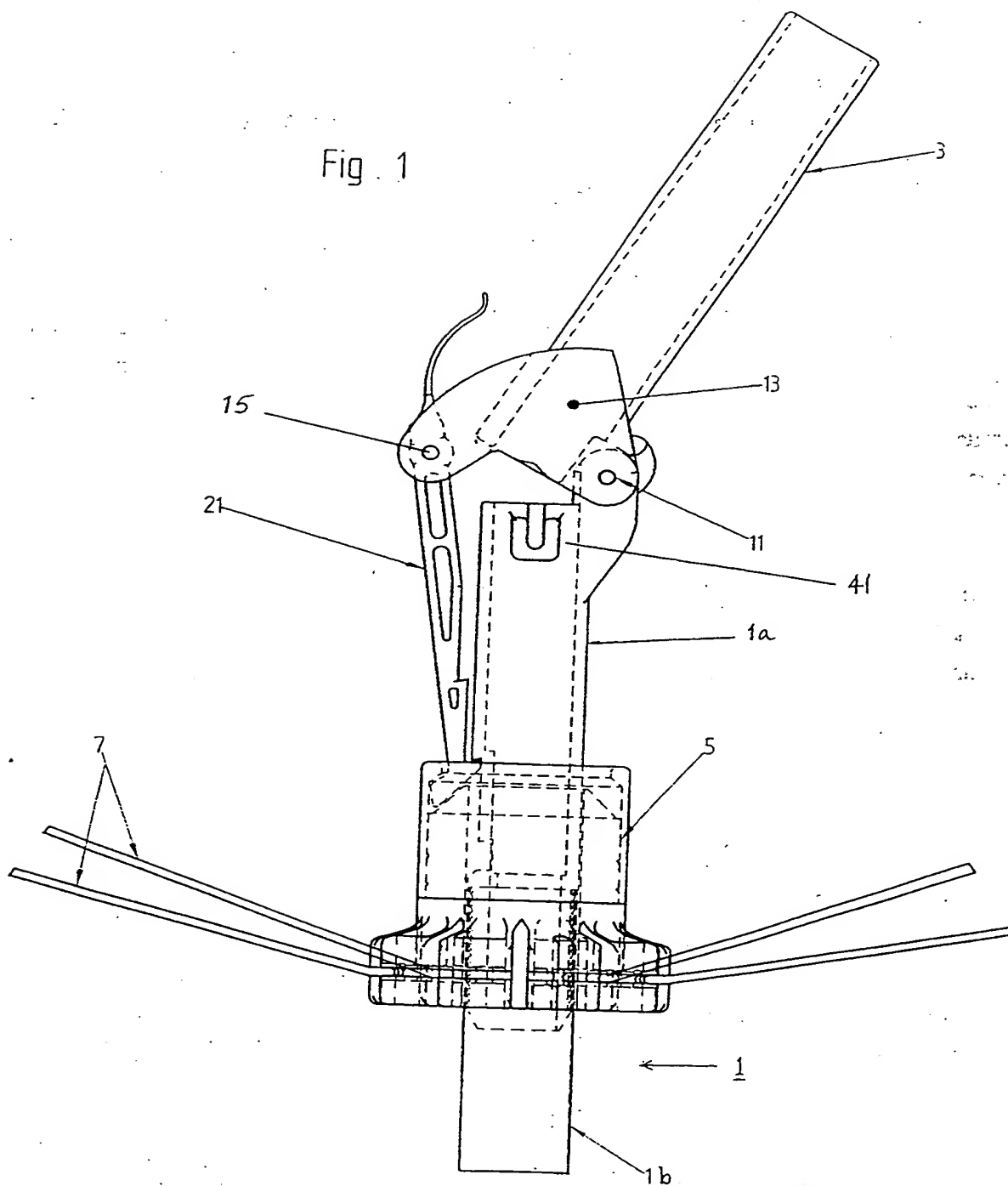
 7. An umbrella frame according to claim 6, in which the runner and the lug have suitable inclined surfaces such that the upward movement of the runner
15 lifts the lower end of the lever out of the recess, freeing the lever to be pushed upwards.

 8. An umbrella frame according to claim 7, in which the runner includes a sleeve-shaped upper section
20 of a diameter rather greater than that of the shaft, the upper edge of the sleeve-shaped section including the said lip.

 9. An umbrella frame according to claim 5 and
25 further including a tilt stop means for arresting the lever and thus preventing the upper shaft part from tilting beyond a certain point.

 10. A tilting umbrella of the kind in which
30 unfurling and tilting the umbrella is performed by means of a crank, draw cord or other means lower down on the lower shaft part, i.e. accessible to a user, and in the case of a crank some device such as a cable or rack mechanism for transforming the turning action into
35 a lift of the runner and, subsequently, a tilt of the upper shaft part; including an umbrella frame according to claim 1.

Fig. 1



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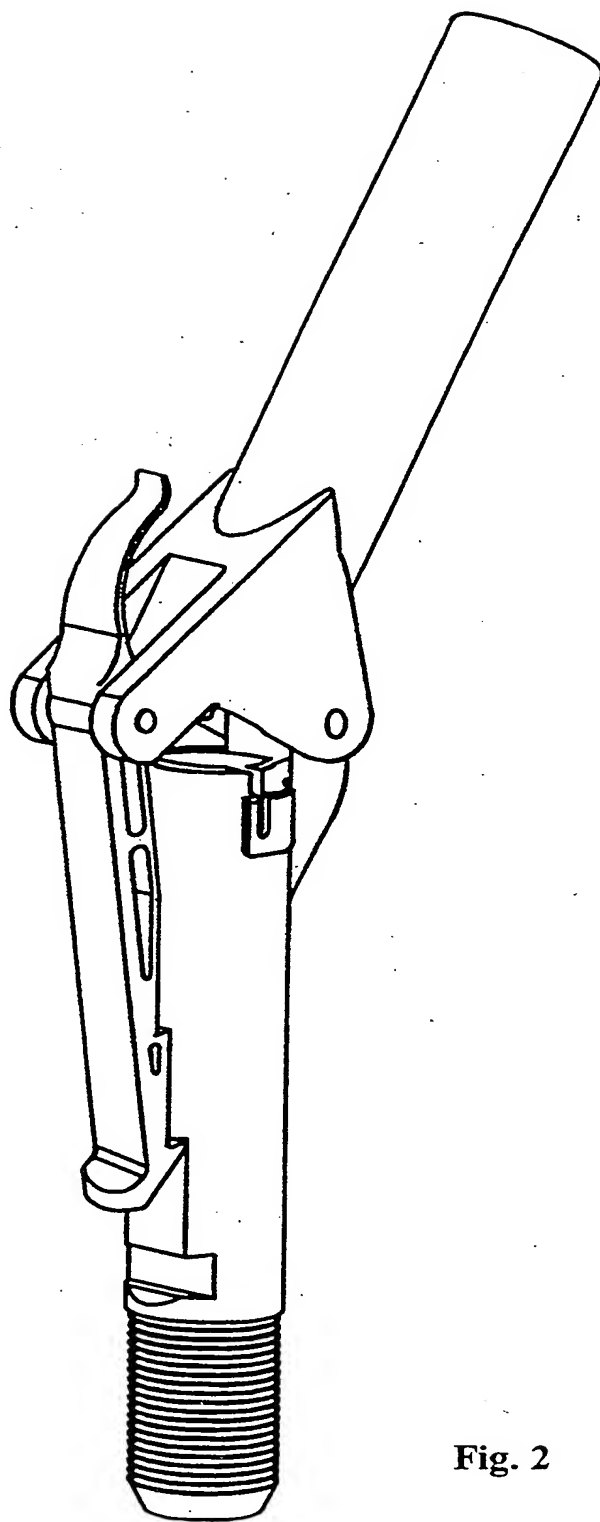
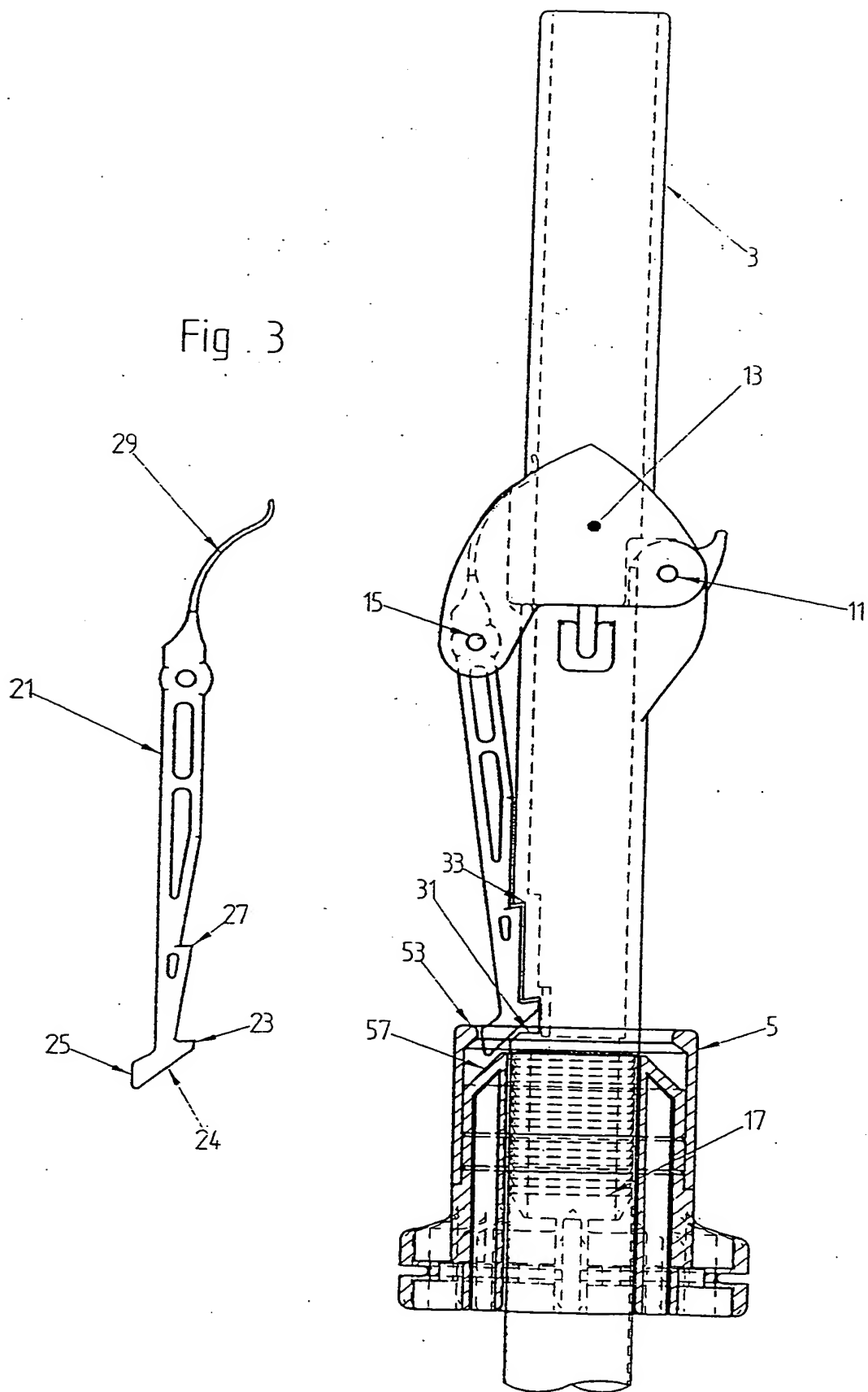


Fig. 2

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Fig. 3



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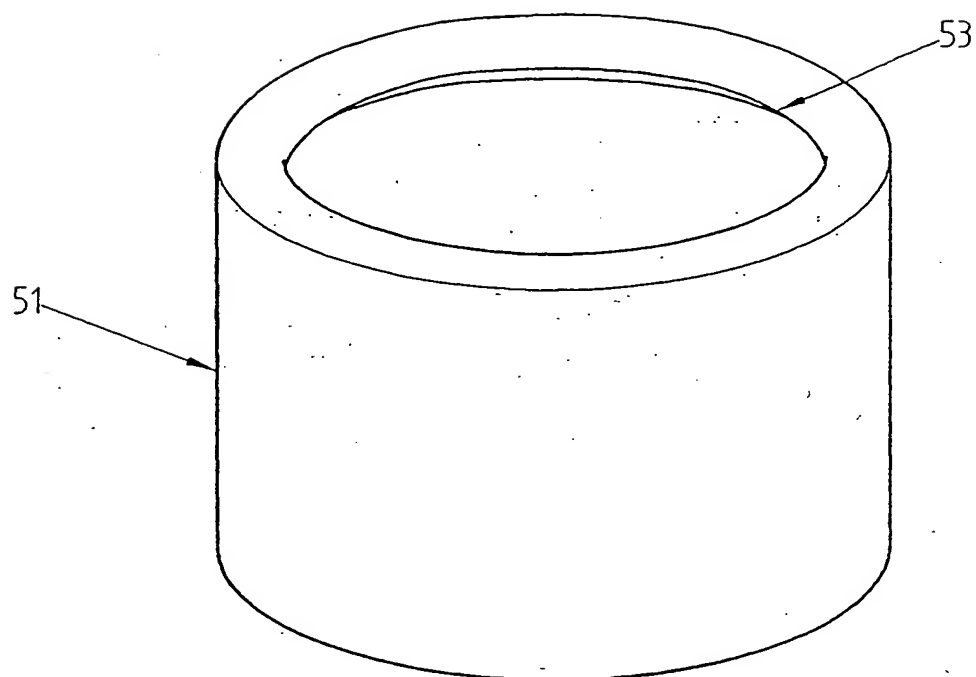


Fig. 4A

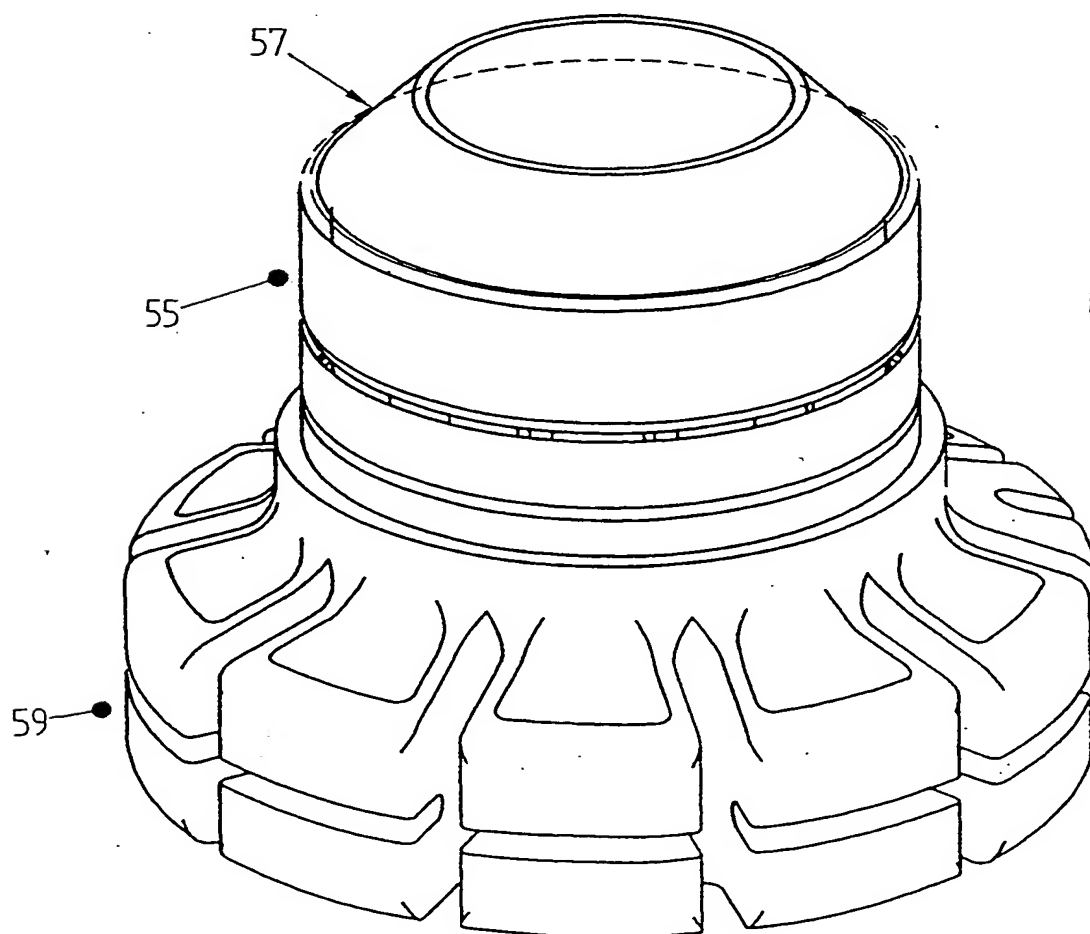


Fig. 4B

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INTERNATIONAL SEARCH REPORT

Int. Application No

PCT/GB 99/01382

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A45B17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A45B F16C

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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 681 794 A (HOYLAND FOX LTD) 15 November 1995 (1995-11-15)	1,3
A	the whole document	2
A	US 3 182 673 A (SMALL, S. N.) 11 May 1965 (1965-05-11) cited in the application	1-4, 10
	the whole document	
A	EP 0 368 539 A (HOYLAND FOX LTD) 16 May 1990 (1990-05-16) abstract; figure 6	1
A	DE 22 04 217 A (BREMSHEY AG) 9 August 1973 (1973-08-09) figures 1,9	3

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- 11 August 1999

Date of mailing of the international search report

18/08/1999

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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